भारतीय मानक
Indian Standard

IS 5884 : 2020

वस्त्रादि फर्श आवरण — हस्त टफ्टेड कालीन — विशिष्टि

(तीसरा पुनरीक्षण)

Textile Floor Covering — Hand Tufted Carpets — Specification

(Third Revision)

ICS 59.080.60

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December 2020 **Price Group 6**

Wool, Wool Products and Textile Floor Coverings Sectional Committee, TXD 04

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wool, Wool Products and Textile Floor Coverings Sectional Committee had been approved by the Textiles Division Council.

This standard was originally published in 1970 and subsequently revised in 1987 and 1993. The present revision has been made in the light of experience gained since its last revision and to incorporate the following major changes:

a) Title of the standard has been modified.
b) Manufacture clause has been modified.
c) Requirement of pile density and pile thickness clause has been modified.
d) Requirement and tolerance for pile height, pile weight and pile yarn have been specified.
e) Labeling and marking clause has been modified.
f) References given in Annex A have been updated.

The composition of the Committee responsible for the formulation of this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounding off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should the same as that of the specified value in this standard.

Indian Standard

TEXTILE FLOOR COVERING — HAND TUFTED CARPETS — SPECIFICATION

(Third Revision)

1 SCOPE

1.1 This standard prescribes the construction particulars and performance requirement of hand tufted carpet made from wool or man-made fibres or their blends.

1.2 This standard does not specify color, design effect, general appearance of the carpet.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 11205 shall apply.

4 MANUFACTURE

4.1 Pile Yarn

The yarn used in the manufacture of pile or tufts of carpet shall be made from wool or manmade fibers or their blends spun on woollen, semi worsted or worsted system or handspun.

4.2 Loop Pile

The level loop pile has loops of yarn of uniform length (*see* Fig. 1) formed in continuous rows or variable loop pile height may also be used as per the design.

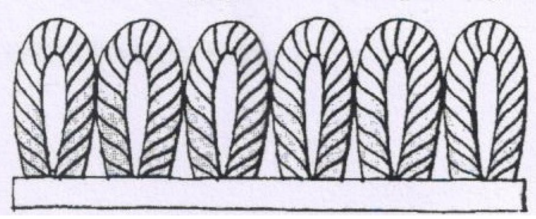


FIG. 1 LOOP PILE

4.3 Cut Pile

The cut pile style results from cutting the tops of all the loops during tufting, with each loop becoming two tufts. The tuft tend to stand upright and form an even surface (*see* Fig. 2).

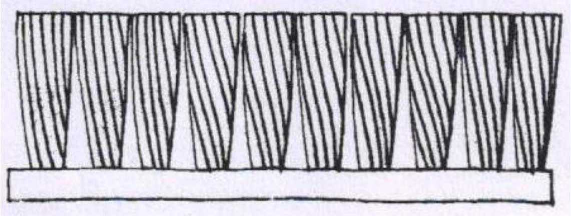


FIG. 2 CUT PILE

NOTE — Mixed pile type of loop and cut pile may be used as per the design requirement, if required by the buyer.

4.4 Hand Tufted Carpet

The easiest way to identify hand tufted carpet is by observing the back of the carpet where a woven backing fabric is attached with latex. No designs shall be visible form the back of the carpet. Manual edge binding with uneven stitching length will confirm the genuineness of hand tufted carpets.

4.5 Tufting

In tufting, pile yarns are inserted into a primary backing fabric through needle by either hand operated manual or hand operated tufting guns. The action is similar to the action of a sewing machine.

4.6 Primary Backing Cloth

Primary backing cloth can be of cotton, jute carpet backing fabric [*see* IS 4900 (Parts 1 to 3)], polypropylene, spun polyester.

4.7 Back Coating or Latexing

The carpet after tufting shall be coated with natural latex or any suitable synthetic coating and a net fabric is attached. Back coating with latex and net is applied to secure the tufts.

4.8 Secondary Backing Fabric

A secondary backing of jute, cotton, polyester or other suitable blended material may be firmly bonded to the carpet, if required by the buyer. The secondary backing with a suitable fabric is pasted which provide dimensional stability to the carpet.

4.9 Shearing

It produces a uniform pile surface.

4.10 Edge Binding

To save the carpet's side form rough and tough use, abrasion and folding on the edges, binding is provided with number of plies of yarn, depending on yarn count and desired thickness of binding in same or contrast colour of the ground.

5. REQUIREMENTS

5.1 Length and Width

The length and width of the carpet shall be as agreed to between the buyer and seller or as declared by the seller on the label of the carpet.

5.1.1 *Tolerances*

In case of carpet sold as square and rug, a tolerance of ± 15 mm/m shall be permitted on agreed or declared value of length and width subject to a maximum of 10 cm for length and 5 cm for width. In case of carpets sold as piece-goods in running length, a tolerance of ± 15 mm/m subject to a maximum of 5 cm shall be permitted on agreed or declared value of width only and the length shall not be less than the declared or agreed value.

5.1.2 The length and width of the carpet shall be determined by the method prescribed in IS 7877 (Part 5).

5.2 Blend Composition of Pile Yarn

The blend composition of the pile yarn shall be as agreed to between the buyer and the seller or as declared by the seller subject to a tolerance of ± 2 percent.

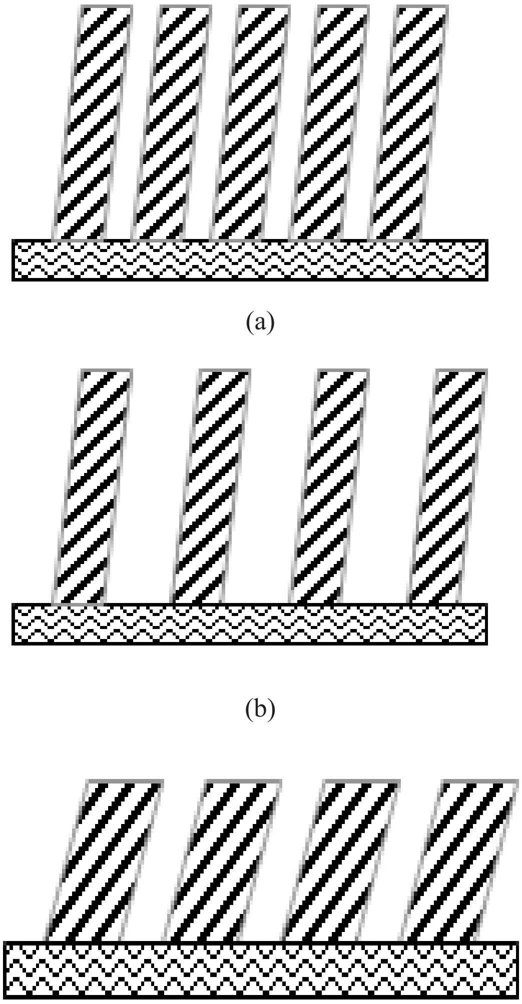
5.2.1 The blend composition shall be determined as per method prescribed in IS 2005 or IS 2006 or IS 3421 or IS 6503 depending upon the type of fibre present in the blend.

5.3 Pile Density

The pile density of the carpet shall be as agreed to between the buyer and seller or as declared on the label subject to a minimum of 50 g/m²/mm pile thickness. However a tolerance of minus 5 percent shall be permitted on the agreed or declared value.

NOTE — Normally tufted carpets are manufactured in the range of 50 to 120 g/m²/mm pile.

5.3.1 The pile density of the carpet shall be determined by the method prescribed in **B-2.** The pile density measures the 'compactness' of the pile. Carpets (a) has a higher tuft density than (b) and (c). Carpets (a) and (c) have high pile densities than carpet (b) (*see* Fig. 3).



(a)

(b)

(c)

FIG 3 TUFT DENSITY AND PILE DENSITY OF CARPET

5.4 Pile Thickness and Pile Height

5.4.1 *Pile thickness*

The pile thickness is the thickness of the pile layer. It may be less than the pile height. The pile thickness of the carpet shall be as agreed to between the buyer and seller subject to a minimum of 3 mm. The tolerance limit for pile thickness and pile height shall be 'not more than 10 percent' of the declared value.

The pile thickness of the carpet shall be determined by the method prescribed in **B-2**.

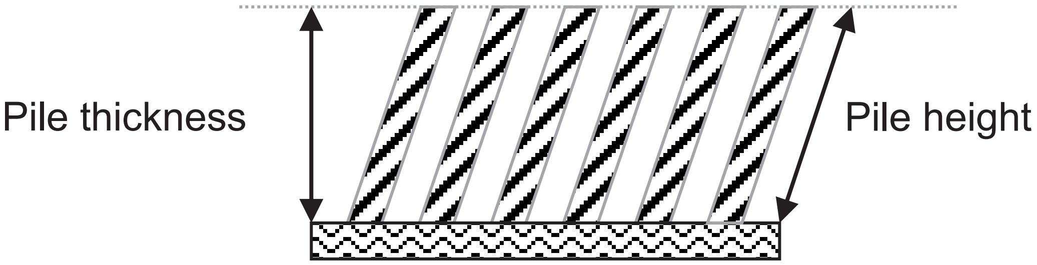


FIG 4 PILE THICKNESS AND PILE HEIGHT

5.4.2 *Pile height*

The vertical measurement from the surface of the primary backing to the top of the tufted yarn is called the Pile height. This is the length of a cut tuft or one leg of a loop from its tip to the point where it enters the carpet backing. Short tufts, which tend to remain upright, look and wear better than long tufts, which tend to bend and lie over. The pile height of the carpet shall be determined by the method prescribed in IS 7877 (Part 4).

5.5 Color Fastness

The cumulative color fastness rating of a carpet towards light, water, shampooing and dry rubbing shall be not less than 13 subject to a minimum of 4 for light and 3 each for the other colorfastness parameters. A tolerance of – 1 unit shall, however, be permitted on the declared value of the cumulative color fastness rating.

NOTE — The maximum color fastness ratings achievable by these agencies are 8, 5, 5 and 5 respectively totaling 23.

5.5.1 The color fastness of pile yarn to various colorfastness parameters shall be determined by the methods specified in IS/ISO 105-B01 or IS/ISO 105-B02 (*see* Note), IS/ISO 105-X12, IS/ISO-E01 and IS 11969.

NOTE — In case of dispute, color fastness to light shall be determined by the method specified in IS/ISO 105-B01 : 2014.

5.6 Tuft Withdrawal Force

The minimum tuft withdrawal force shall be 1.5 kgf and 2.5 kgf for cut pile and loop (uncut) pile respectively.

5.6.1 The tuft withdrawal force shall be determined by the method given in **B-3**.

5.7 Moth Resistance

In case a carpet containing wool is rendered moth-resistance as per the treatment specified in IS 11662, the amount of preservative agents used shall satisfy the requirements given in IS 11662. In case any other moth-resistant treatment is used, the type of preservative agent, method of its application, amount applied and method of its determination shall be a matter of prior agreement between the buyer and the seller.

5.8 Pile Weight

5.8.1 *Total Pile Weight*

It is the weight in grams per square meter of all the pile yarn (including pile yarn woven into the backing). The tolerance limit total pile weight shall be 'not more than 10 percent' of the declared value.

5.8.2 *Shorn Pile Weight*

It is the weight in grams per square metre, which is shorn off above the backing, called the effective or shorn pile weight. It is a measurement used in assessing carpet performance.

5.8.3 The total pile weight and shorn pile weight of the carpet shall be determined by the method prescribed in ISO 8543.

5.9 Pile yarn

The structure of the yarn largely determines the appearance (that is texture) of the carpet. The tolerance limit for pile yarn count shall be 'not more than 10 percent' of the declared value.

The following terms describes the structure of a yarn;

5.9.1 *Yarn Count*

The yarn count is a measure of the yarn linear density. Yarn count shall be measured as per IS 681 in Tex and reported in metric count (Nm).

For practical purposes, it is defined as the number of yards per 0.5 ounce weight of yarn.

5.9.2 *Yarn Twist*

The yarn twist measures the amount of twist of the yarn (normally expressed in turns per meter). If a two-fold yarn in used, It is necessary to specify the twist levels (1) for the singles yarns, and (2) for the twisted combination.

To give the yarn stability, the directions of the singles and folding twist are in opposition directions. Twist has a major influence in the strength of a yarn and therefore the weaving or tufting efficiency.

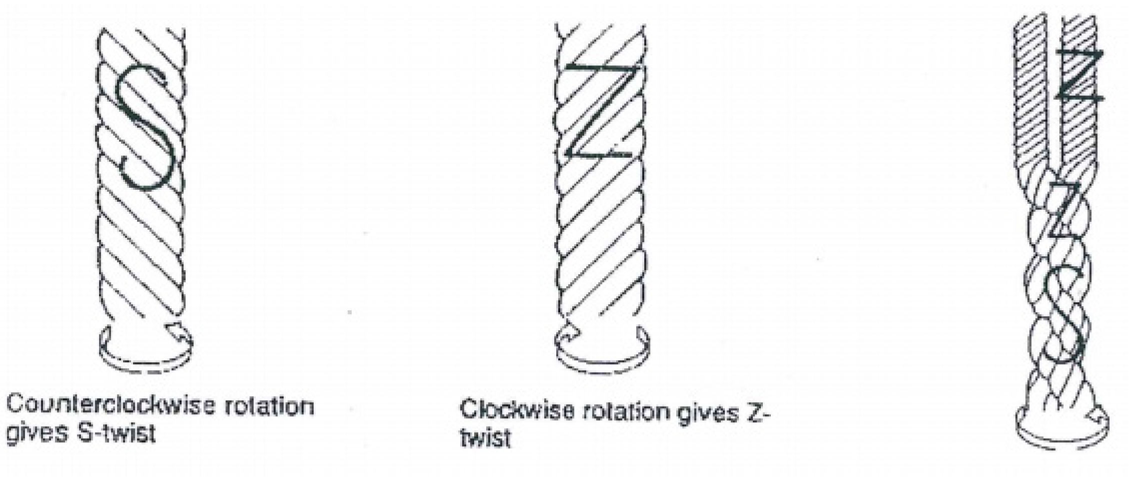

S
Z
Z
Z
S
Counterclockwise rotation gives S-twist
Clockwise rotation gives Z-twist

FIG. 5 YARN TWIST

Twist also influences the appearance of the pile in the finished carpet. Turns per inch (TPI) of pile yarn is called the twist level. It ranges from 3-9. The twist of the yarn shall be determined by the method prescribed in IS 832 Part 1.

5.9.3 *Yarn Ply*

The yarn ply is the number of strands that have been twisted together. Yarns can be tufted as a single strand (a singles yarn), or with two or more strands of yarn twisted together (a plied or folded yarn).

Two strands twisted together form a two ply yarn (the most common yarn used for carpets).

6 LABELLING AND MARKING

6.1 A white cloth label of 10 cm × 7.5 cm or a paper sticker marked with the following information shall be securely attached or fixed to one of the corners on the back of the carpet:

a) Name of the product;
b) Type of pile, that is loop (uncut) pile or cut pile or mixed pile;
c) Length x width of carpet, in cm;
d) Blend composition of pile yarn;
e) Pile height and pile thickness (mm);
f) Pile weight (gms) and pile yarn count (Nm/Tex);
g) Pile density (g/m^2/mm pile thickness);
h) Cumulative colour fastness rating;
j) Words treated for moth-resistance; (in case of carpet containing wool); and
k) Indication of the source of manufacture.

6.2 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 PACKING AND MARKING OF PACKAGES

Unless otherwise agreed, the carpets shall be packed as per the method given in IS 5756 and the packages shall also be marked with the information given in IS 5756.

8. SAMPLING AND CRITERIA FOR CONFORMITY

8.1 Lot

All the carpet having same pile yarn blend, pile density and pile thickness delivered to a buyer against a dispatch note shall constitute a lot.

8.2 The conformity of the lot shall be determined on the basic of the tests carried out on the sample selected from the lot.

8.3 Unless otherwise agreed to between the buyer and the seller, the carpets to be selected at random shall be as given in Table 1.

Table 1 Sampling Plan

(*Clauses* 8.3 *and* 8.4)

Sl No.	Number of Carpets in the Lot	Sample Size	Sub-sample Size
(1)	(2)	(3)	(4)
i)	Up to 15	3	2
ii)	16 to 25	5	3
iii)	26 to 50	8	3
iv)	51 to 100	13	5
v)	101 and above	20	5

8.4 Number of Samples and Criteria for Conformity

The number of carpets in the sample and criteria for determining conformity of the lot to the requirements specified in this standard shall be as under:

Characteristic Conformity	*Numbers of Test Sample*	*Criteria*
Length and width	All carpets	Carpets not confirming to **5.1** and **5.1.1** shall be rejected
Pile thickness	According to column 3 of Table 1	All the test sample shall satisfy the relevant requirements
Moth-resistance, pile density, colour fastness, tuft withdrawal force and blend composition	According to column 4 of Table 1	

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
196 : 1966	Atmospheric condition for testing fibres (*first revision)*
681 : 2015	Textiles — Methods for determination of universal count of woollen and worsted yarn (*first revision*)
832 (Part 1) : 2011/ISO 2061 : 1995	Textiles — Determination of twist in yarns: Part 1 Direct counting method (*second revision*)
2005 : 1988	Method for quantitative chemical analysis of binary mixture of nylon 6 or nylon 6.6 fibres and certain other fibres (*second revision*)
2006 : 1988	Method for quantitative chemical analysis of binary mixture of protein fibers with certain other non-protein fibers (*second revision*)
3421 : 1988	Textile — Binary mixture of acrylic certain mod acrylics and certain other fibres — Methods for quantitative chemical analysis (*first revision*)
4900	Specification of jute carpet backing fabric
(Part 1) : 1984	General (*first revision*)
(Part 2) : 1984	237, 271, 305, 339 and 407 g/m^2 (*first revision*)
(Part 3) : 1984	186 and 203 g/m^2 (*first revision*)
5756 : 1970	Code for packaging of carpets
6503 : 1988	Methods for quantitative chemical analysis of ternary mixture of protein fibers, nylon 6 or nylon 6.6 and certain other fiber (*first revision*)
7877	Methods for sampling and tests for hand-made carpets
(Part 4) : 1976	Determination of pile height
(Part 5) : 1976	Determination of dimension
11205 : 2011/ ISO 2424 : 2007	Textile floor coverings — Vocabulary (*first revision*)
11662 : 1986	Specification for preservative treatment of textiles
11969 : 2020/ ISO 18168 : 2015	Textile floor coverings — Colour fastness to shampooing (*first revision*)
IS/ISO 105-B01 : 2014	Textiles — Tests for colour fastness Part B01 Colour fastness to light: Daylight
IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness Part B02 Colour fastness to artificial light: Xenon arc fading lamp test
IS/ISO 105-E01 : 2010	Textiles — Tests for colour fastness Part E01 Colour fastness to water
IS/ISO 105-X12 : 2016	Textiles — Tests for colour fastness Part X12 Colour fastness to rubbing (*first revision*)
ISO 8543 : 2020	Textile floor coverings — Methods for determination of mass

ANNEX B

(*Clauses* 5.3.1, 5.4.1 *and* 5.6.1)

METHOD OF TEST TO DETERMINE PILE THICKNESS, PILE DENSITY AND TUFT WITHDRAWAL FOURCE OF TUFTED CARPETS

B-1 ATOMOSPHERIC CONDITION FOR TESTING AND CONDITIONING OF TEST SPECIMENS

B-1.1 The test shall be carried out in the standard atmosphere of 65 ± 2 percent relative humidity and 27 ± 2 °C temperature (*see also* IS 196).

B-1.2 Prior to testing, the test specimens shall be conditioned to moisture equilibrium in the standard Atmosphere. When the test specimens have been left been such at atmosphere for 72 hours in such a way as to expose, as far as possible, all portion of test specimens to the atmosphere, they shall be deemed to have reached moisture equilibrium.

B-2 DETERMINATION OF PILE THICKNESS AND PILE DENSITY

B-2.1 Test Specimen

B-2.1.1 Cut four specimens, each at least 200 × 200 mm with the two sides parallel and the other two perpendicular to the selvedge.

B-2.1.2 If there is any tendency for the edges to fray, seal them with adhesive and allow to dry. Condition the specimens to contain weight in the standard atmosphere.

B-2.2 Apparatus

B-2.2.1 *Carpet Shearing Machine*

Capable of sharing the pile close to the backing of the carpet.

B-2.2.2 *Carpet Thickness Tester*

a) Should have a circular plane pressure-foot of are between 300 and 1 000 mm^2.
b) Should be capable of exerting a pressure of 20 gf/cm^2 normal to the plane of the specimen.
c) Should be capable of measuring thickness to any accuracy of 0.1 mm over a range 25 mm.

B.2.2.3 *Sharp Point Knife.*

B-2.2.4 *Measuring Scale* — graduated in millimeter.

B-2.2.5 *Weighting Balance,* to width to any accuracy of 10 mg.

B-2.2.6 *Press and Cutter,* of known area of at least 10 000 mm^2, which may be circular or square in shape.

B-2.3 Test Procedure

B-2.3.1 Measure the thickness of each specimen at 5 places under the standard pressure of 20 gf/cm^2.

B-2.3.2 Determine the mass of pile using the method given below before the edges of the pile have been sealed as given in **B-2.1.2.**

a) Weigh each specimen to the nearest 10 mg (M_1).
b) Measure the length and width at four places on the back of each specimen to the nearest mm.
c) Shear the pile form the specimen using forward strokes with the clipper in all directions. Shear as close as possible to the backing by running the points of the comb and cutter along the backing without digging in. Avoid plucking any tufts or damaging the backing yarn. Brush, blow or suction clean the specimen during and after shearing. Continue shearing until no further significant amount of pile yarn dust appears on the shearing blades or flies away when the specimen in shaken. It is not necessary to shear to the edges of the specimen provided the area of at least 10 000 mm^2 in the centre is closely shorn.
d) After shearing, cut the area of 10 000 mm^2 from the centre of each specimen using a cutter. The backing yarns in this area shall be undamaged and no tufts shall have been plucked from it.
e) Condition each area cut out of the shorn carpet specimen in the standard atmosphere until successive weighing at intervals of two hours shown no progressive change greater than 0.25 percent. Record the final condition mass of the shorn area to the nearest 10 mg (M_2).
f) From the measurement made in (b), calculation for each specimen the average length and width and the area in square millimeters (A_1).
g) Calculate the total mass per square millimeter of carpet for each specimen separately $\frac{(M_1)}{(A_1)}$.
h) Measure the area of the specimen cut out of shorn carpet (A_2).
i) For each area of shorn carpet, calculate the mass per square millimeter $\frac{(M_2)}{(A_2)}$.
j) For each specimen, calculate the shorned mass the pile above unit are of backing, using the formula:

$$10^6\left[\frac{M_1}{A_1}-\frac{M_2}{A_2}\right] g/m^2$$

where

$\frac{(M_1)}{(A_1)}$ = mass per mm^2 of carpet before shearing,

$\frac{(M_2)}{(A_2)}$ = mass per mm^2 of carpet after shearing

k) Calculate the mean value of the shorned mass of pile above unit area of backing from the value obtained from all the specimen (*M*).

B-2.3.3 Measure the thickness of each shorn specimen as obtained in **B-2.3.2** (d) at 5 places under the standard pressure of 20 gf/m^2.

B-2.4 Calculation

B-2.4.1 *Pile Thickness*

For each specimen, calculate the mean thickness unshorn and the mean thickness shorn. Calculate for each specimen the thickness of pile as the sufferance between these figure, in mm to the nearest 0.02 mm. Calculate the mean value of pile thickness for all the specimen in mm to the nearest 0.1 mm (*t*).

B-2.4.2 *Pile Density*

The pile density (in g/m^2 per mm pile thickness) shall be calculated by dividing the mean value of mass of pile above until area of backing (*M*) by mean value of pile thickness (*t*).

B-3 DETERMINATION OF TUFT WITHDRAWAL FORCE

B-3.1 Apparatus

B-3.1.1 Tensile testing apparatus with suitable ranges and an accuracy of ± 5 percent. Full scale loads ranging from 0.5 to 10.0 kgf are generally adequate.

B-3.1.2 Apparatus shall preferable have a constant rate of lading but alternatively, constant rate of traverse or extension may be used. In any case the average test time for achievement of the maximum withdrawal force of the tufts and loop tested should be between 5 and 10 s. This may be achieved in machines which would give very short test time, for example, those using load sells, by increase a spring between the loading mechanism and the specimen.

B-3.1.3 The apparatus shall have a means of clamping a specimen of carpet to base plate so that it is flat in a plane perpendicular to the direction of pull upon the tuft or loop. The flat, horizontal part of the clamp, which is brought in to contact with the specimen during the testing, shall be at least 60 mm × 60 mm, shall have the circular cut out of the 12 mm radius around the tuft, or loop to be withdrawn and shall retain the specimen inside this cut-out area (*see* Fig. 5). The cut-out may have a throat to allow easier positioning of the specimen with the tuft grip or hook attached.

B-3.1.4 for cut pile carpets, a suitable means of its selecting and griping one end of tuft shall be provided (for example, surgical forceps) and for loop pile carpets, a suitable hook (for example, a knitting machine needle) is require. These tufts grip are attached to the upper jaw of the tensile testing apparatus.

B-3.1.5 The load sensing mechanism of the machine shall be calibrated with the tuft grip or hook position.

B-3.2 Test Sample and Specimens

Samples shall be selected form at least 5 places across width of the carpet. Sample shall be conditioned as mentioned in **B-1.2**. Specimen should be cut (one from each sample) to a size which is convenient for clamping on the testing machine and which will allow for at least 10 tufts to be removed from each. No tufts shall be removed from within 25 mm of the edge of a specimen or of any previously withdrawn tuft.

B-3.3 Procedure

B-3.3.1 *Cut Pile Carpets*

Select one end of one tuft and attach the tuft grip. Clamp the specimen firmly and attach the tuft grip to the upper jaw. Set the machine in motion and withdraw the tuft completely in a direction essentially perpendicular to that of carpet specimen. Check that only one complete tuft is withdrawn, and record the maximum force.

B-3.3.2 *Loop Pile Carpets*

Select a suitable loop and engage the hook under the top of it. Clamp the specimen firmly and attach the hook to the upper jaw. Set the machine the motion to move the hook in a direction essentially perpendicular to that of carpet specimen, and stop it as soon as slippage occurs in the bend holding one of the loop sides. Record the maximum force.

B-3.3.3 Repeat the procedure for a minimum of 20 tufts or loops, spread evenly through available samples, taking care that these are at least 25 mm between the previously withdrawn tuft or from the edge of specimen.

B-3.4 Report

Report the average of the tests to the nearest 50 gf as the tuft withdrawal force.

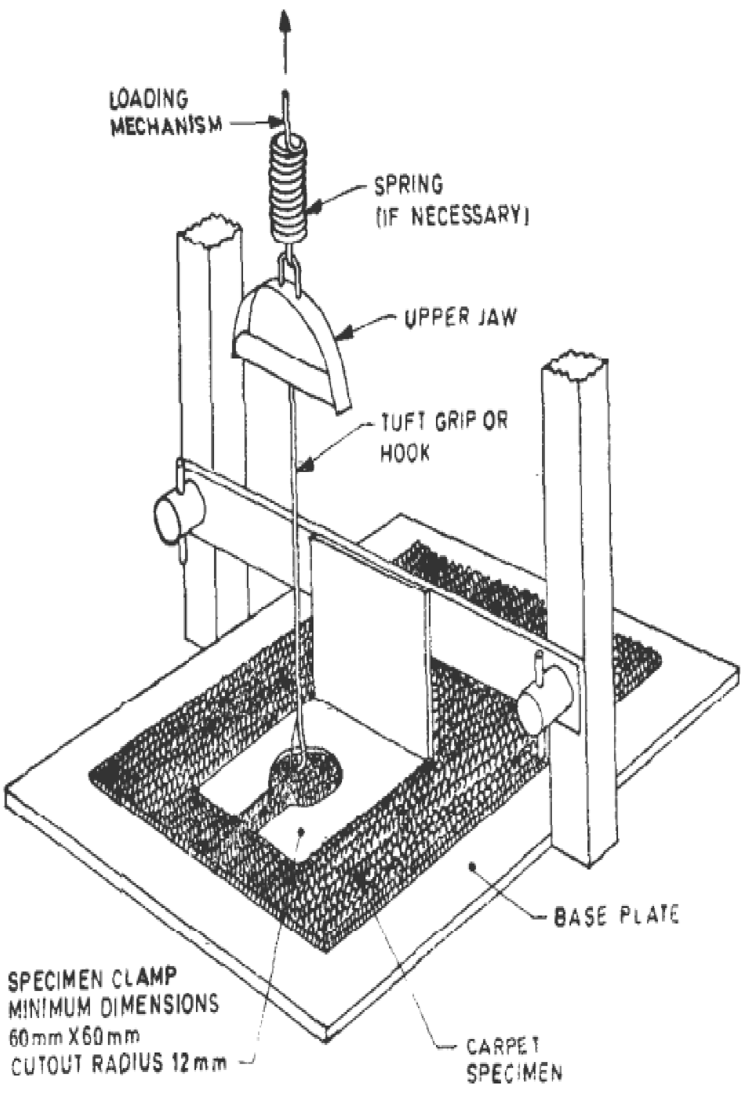


FIG. 6 TYPICAL FORM OF HORIZONTAL MOUNTING

ANNEX C

(*Foreword*)

COMMITTEE COMPOSITION

Wool, Wool Products and Textile Floor Coverings Sectional Committee, TXD 04

Organization	*Representative(s)*
Central Sheep & Wool Research Institute, Avikanagar	Dr D. B. Shakyawar (***Chairman***)
Agnext Technologies Pvt Limited, Mohali	Shri Taranjeet Singh Bhamara Shri Salil Lakhanpal (*Alternate*)
All India Carpet Manufacturers' Association, Bhadohi	Shri Ravi Patodia Shri Surenda K. Baranwal (*Alternate*)
Bholanath International Limited, Varanasi	Shri Bholanath Baranwal
Carpet Export Promotion Council, New Delhi	Shri Sanjay Kumar Shri Subodh Kumar Gupta (*Alternate*)
Central Sheep & Wool Research Institute, Avikanagar	Dr Ajay Kumar Dr Vinod Kadam (*Alternate*)
Central Wool Development Board, Jodhpur	Shri Anurag Purohit Shri Ramesh Kumar Bundela (*Alternate*)
Craft Development Institute, Srinagar	Dr Zubair Ahmad Shri Younis Farooq (*Alternate*)
Directorate of Animal Husbandry, Jaipur	Dr J. S. Sehgal
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	Shri A. Chowdhury Shri P. De. (*Alternate*)
Indian Institute of Carpet Technology, Bhadohi	Prof Alok Kumar Dr Betty Dasgupta (*Alternate*)
Indian Institute of Carpet Technology, Srinagar	Dr Zubair Ahmad
Indian Institute of Technology, Delhi	Prof R. Chattopadhyay Prof Vijay Kumar Baheti (*Alternate*)
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Looms of Ladakh, Leh	Shrimati Regzen Yangdol
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Office of the Textile Commissioner, Mumbai	Shri Sourabh Kulkarni Shri U. K. Sharma (*Alternate*)
Raymonds Limited, Thane	Dr G. S. Singh
Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	Prof Sarfaraz Ahmad Wani Dr Asif Hassan Sofi (*Alternate*)
Textiles Committee, Delhi	Ms Shilpi Chauhan Shri Ganesh Bangar (*Alternate*)
Welspun India, Hyderabad	Shri Prasad Kulkarni Shri Dwarka Nath Panda (*Alternate*)
Wool & Woollens Export Promotion Council, New Delhi	Shri Mahesh N. Sanil Shri Suresh Thakur (*Alternate*)

Organization	*Representative(s)*
Woolmark Services India Pvt Ltd, New Delhi	Shri Kaushik Choudhary
Wool Research Association, Thane	Dr Shishir Tyagi Shri Mayur Basuk (*Alternate*)
BIS Directorate General	Shri A. K. Bera, Scientist 'F' and Head (TXD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Dharmbeer
Scientist 'C' (TXD), BIS

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